

## HETEROGENIOUS LOW-LEVEL DISK STORAGE MANAGEMENT TOOL SYSTEM STACK

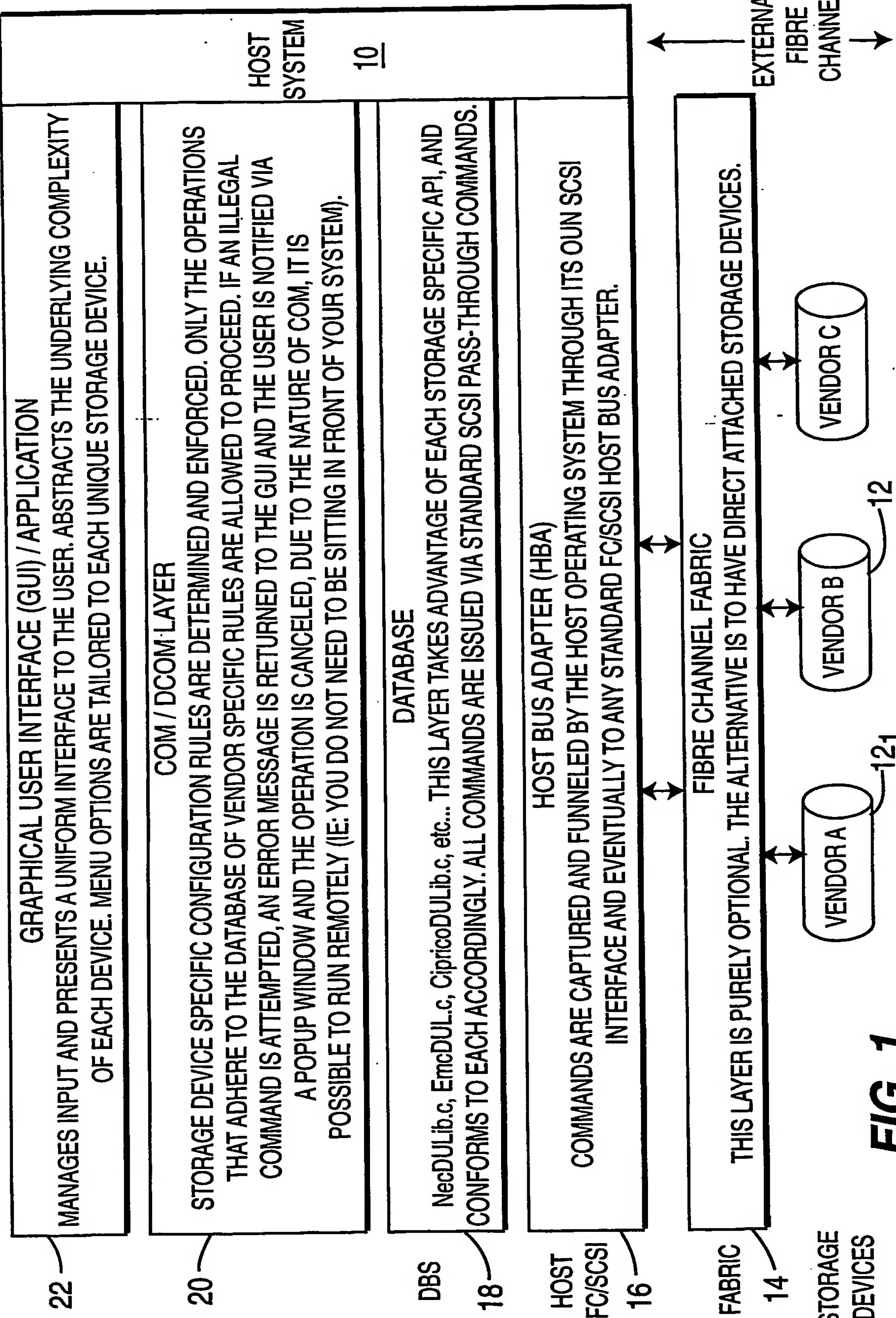


FIG. 1

## HETEROGENIOUS LOW-LEVEL DISK STORAGE MANAGEMENT TOOL OPERATIONAL FLOW CHART

### DISCOVERY

DISCOVERY IS THE FIRST OPERATION PERFORMED UPON STARTING THE STORAGE MANAGEMENT UTILITY. ALL FC/SCSI DEVICES, WHETHER ATTACHED DIRECTLY OR THROUGH A FABRIC, ARE IDENTIFIED AND ENUMERATED. THESE MAY INCLUDE DRIVES, LUNS, AND RAID CONTROLLERS ALL OF WHICH ARE SORTED ACCORDING TO THEIR RESPECTIVE FIBRE CHANNEL IDS, LUN NUMBERS, AND VENDOR UNIQUE IDENTIFICATION STRINGS.

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### CATEGORIZE DEVICES BY VENDOR

BUILD A DATABASE CONTAINING CONFIGURATION AND OPERATIONAL RULES FOR EACH UNIQUE DRIVE OR RAID VENDOR DEVICE ON THE NETWORK.

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### GUI PRESENTATION TO THE USER

PRESENT TO THE USER A UNIFORM GUI COMPRISED OF AN INTUITIVE TREE CONTROL. THE OPERATIONAL COMPLEXITIES OF EACH DISPARATE DEVICE ARE HIDDEN FROM THE USER. BY LEFT CLICKING ANY DEVICE, RELEVANT INFORMATION APPEARS IN THE INFORMATIONAL WINDOW INCLUDING: FIRMWARE REVISION NUMBERS, FIBRE CHANNEL IDS, MODEL NAMES, AND STATE INFORMATION

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### WAIT FOR USER INPUT

THE USER MAY PERFORM A LOW LEVEL OPERATION BY RIGHT CLICKING ON THE DESIRED DEVICE AND SELECTING FROM THE FEATURED MENU OPTIONS, OR BY USING THE MENU OPTIONS AT THE TOP OF THE WINDOW. THESE MAY INCLUDE (BUT ARE NOT LIMITED TO):

- BIND A GROUP OF PHYSICAL DRIVES INTO A LOGICAL UNIT NUMBER (LUN)
- UNBIND LUNS
- DESIGNATE PHYSICAL DRIVES AS HOT SPARES
- SET DEVICE SYSTEM CLOCK
- LOAD VENDOR SPECIFIC FIRMWARE TO INDIVIDUAL CONTROLLERS AND/OR DRIVES
- CHECK/SET VENDOR SPECIFIC CONTROLLER AND/OR DRIVE SETTINGS
- BLINK LEDS FOR IDENTIFICATION PURPOSES
- IDENTIFY STATE INFORMATION
- SET FIBRE CHANNEL IDS FOR EACH DEVICE
- START OR STOP A RAID REBUILD OPERATION
- START OR STOP CONSISTENCY CHECK OPERATIONS
- IN THE CASE OF A DISCREET SYSTEM, INITIALIZE A FILE SYSTEM

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### PROCESS COMMAND

PROCESS THE USER INITIATED COMMAND THROUGH THE SOFTWARE STACK UNTIL EVENTUALLY BEING SERVICED BY THE SPECIFIC DRIVE OR RAID VENDOR DEVICE (SEE THE ACCOMPANYING SOFTWARE STACK BLOCK DIAGRAM).

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### AUTOMATIC REFRESH

ONCE THE COMMAND HAS COMPLETED, AN AUTOMATIC REFRESH OF THE GUI OCCURS BRING THE DISPLAY UP TO DATE WITH THE NEW STATE OF THE STORAGE NETWORK.

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BACK TO: WAIT FOR USER INPUT

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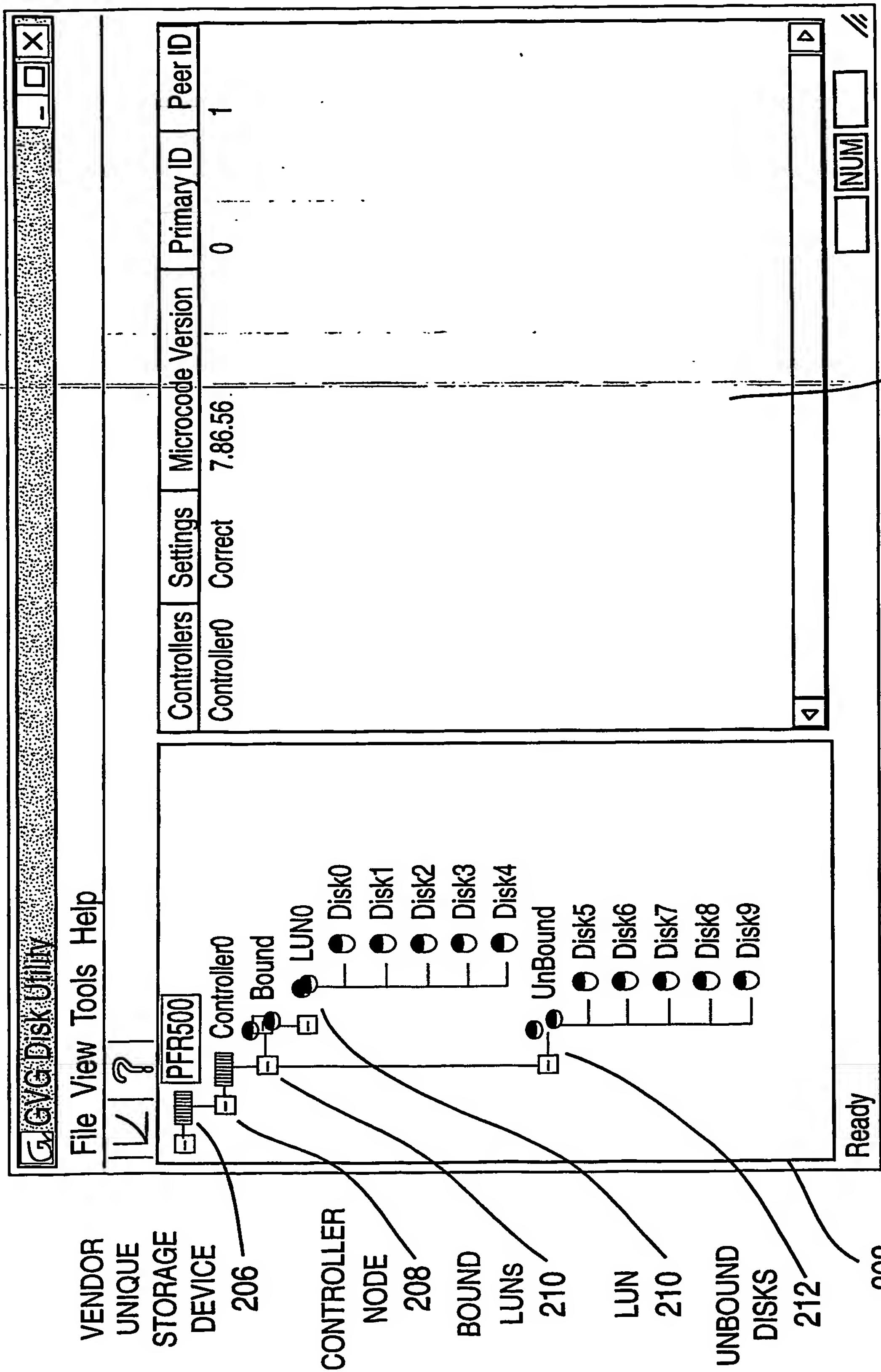


FIG. 3

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